

1MEMS4 **Introduction to Computing** [5 credits]
Module Code: **MEU11EM4**

Lecturer(s): Assistant Professor Kevin Kelly (kevin.kelly@tcd.ie)

Module organisation

SEMESTER: 2	LECTURE/WEEK: 1	LABS/WEEK: 3 hours
DURATION (WEEKS): 11	TOTAL: 11	TOTAL: 33

Module description, aims and contribution to programme

The aims of this module are:

- Establish a good foundation in computer programming for engineering.
- Analyse engineering problems and design algorithms in a structured logically way using MATLAB

Learning outcomes

On successful completion of this module, students will (be able to):

1. Understand the concepts of constants and variables in computer programming
2. Write basic sequential programs using Matlab to analyze engineering problems
3. Use programming control structures such as conditional statements and loops to execute algorithms
4. Use functions and sub-functions, including library and user-defined functions
5. Process textual information
6. Use data structures and cell arrays
7. Low-level read and write to and from file storage
8. Plot data using MATLAB

9. Translate a design brief into a robust, functioning program
10. Layout, comment, explain and debug code

Module content

- Introduction to MATLAB environment
- Vectors and Matrices
- Selection Statements
- Loop Statements and Vectorising Code
- Debugging
- String Manipulation
- Functions
- Data Structures
- File Input and output
- Plotting
- Image processing

ASSOCIATED LABORATORY/PROJECT PROGRAMME

Weekly laboratory assignment associated with each aspect of the syllabus

Teaching Strategies

This module is not the study of computer science, but rather it teaches students to use computers to aid in the analysis of engineering problems. The module is taught using a combination of lectures and computer laboratories. Each week there is one podium lecture where new material is introduced and discussed. There is a two hour laboratory session where each student sits at a dedicated PC and works on that week's assignments. There is also an additional one hour laboratory session in which difficult aspects of the previous session are revised and a new assignment is worked on. This final session allows for a degree of equalizing of students' progress on the essential aspects of the module. Assistance is available during these sessions from both the course lecturer and a teaching assistant

One major assignment, bringing together the key concepts taught in the module. These are given before reading week and in the final weeks of the module. Students are required to present their code individually, explaining the logic of their code and the implications of making any changes, and to provide evidence of a structured development towards meeting the assignment objectives.

Assessment

Graded computer laboratory assignments and attendance (100%).

Continuous Assessment (100%)

Required textbook

- Matlab: A Practical Introduction (Paperback), Attaway, Butterworth-Heinemann, 2009

SUPPLEMENTARY TEXT(S)

- Introduction to Matlab 7; Etter, Kuncicky & Moore, Prentice Hall, 2005
- Introduction to Engineering Programming, Solving Problems with algorithms, Holloway, Wiley, 2004

Further Information

As 1MEMS4 is assessed entirely through continuous assessment during the year, students who do not pass this module will be required to repeat the year in full.